

DEVELOPING A PROCEDURE MODEL FOR BUSINESS PROCESS STANDARDIZATION

Research-in-Progress

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Abstract

Firms are focusing more closely on standardizing or homogenizing instances of a particular business process across different business units or locations. Our paper introduces research in progress on a business process standardization (BPS) procedure model that guides firms in conducting effective BPS firm-wide. This model is currently being developed and tested by applying it to a business process at Lufthansa Technik, following a design science cycle and taking an action research approach. This paper shows how we are following the good-practice guidelines of design science and how we intend to evaluate the applicability and effectiveness of the model. Eventually, we expect this model to contribute significantly to extant research on BPS, which has to date focused on the outcomes of BPS and on the contingencies of BPS effectiveness rather than making prescriptive suggestions for reaping substantial process efficiency gains in large and decentralized firms.

Keywords: Business Process Standardization, Standardization Methodology, Procedure Model, Design Science, Action Research

Introduction

For many firms, international business activities offer large potentials for growth. The downside is increasing global competition, longer value chains, and more complex business models (PWC 2011). Consistently high-quality services and a consistent customer-facing appearance across different business units and locations are vital to ensuring long-term competitive capability (Manrodt and Vitasek 2004; Ramkumar and Cooper 2004; Swaminathan 2001). One strategy for ensuring this consistency is to standardize standard business processes across different locations (Davenport 2005; Münstermann and Weitzel 2008) by determining and adopting a company-wide, consistent best-practice business process to ensure the “single-face-to-the-customer” (Manrodt and Vitasek 2004; Ramkumar and Cooper 2004). In addition to ensuring consistency, business process standardization (BPS) has a positive impact on process performance (Münstermann et al. 2009; Ramkumar and Cooper 2004).

However, in a global firm with disperse facilities, BPS represents a major organizational challenge with considerable difficulties and costs (Schmelzer and Sesselmann 2008) and the literature provides few if any formal and consistent methodologies for conducting successful BPS projects. Our research will attempt to fill this gap by developing a process standardization methodology that supports organizations in conducting effective BPS. This ongoing developmental research is being jointly conducted by a team of university researchers and Lufthansa Technik (LHT) in Germany to establish firm-wide process standardization among the different LHT sites in various countries. We follow an cyclic action design research approach (Sein et al. 2011), aiming to answer the following research question:

What approach can a firm follow to standardize its business processes effectively?

The next section introduces a theoretical model which sets the frame for later evaluation of the BPS methodology. The section after that describes the current state of the methodology, called JoinIN! and the final section discusses how our research follows the guidelines and how we intend to execute the construction/evaluation cycle in the LHT organization.

Theoretical Framing

Business process management (BPM) includes a variety of capabilities ranging from strategic alignment and governance (De Bruin and Rosemann 2007) to process modeling. Most BPM activities aim to increase process performance by identifying inefficiencies and opportunities for improvement. Besides optimization of single business processes, business process standardization has become a major trend in BPM (Davenport 2005; Manrodt and Vitasek 2004).

Business Processes and Business Process Standardization

Davenport and Short (1990) define a business process as a “set of logically related tasks performed to achieve a defined business outcome” (Davenport/Short 1990, p.12). Accordingly, a process standard can be defined as “the best, easiest and safest way to do an activity” (Sánchez-Rodríguez et al. 2006, p. 31). Thus, business process standardization (BPS) means to make “process activities transparent and achieve uniformity of process activities across the value chain and across firm boundaries” (Wüllenweber et al. 2008, p. 213). When modeling, analyzing, and standardizing business processes, they can be described by different dimensions, as outlined in Table 1 (Lin et al. 2002; Tumay 1996).

Table 1. Dimensions of business processes (cf., Tumay 1996)	
Dimension	Description
Workflow	Order of activities to be performed to achieve the process result
Information objects	Information in form of documents or data used in or generated by an activity
Roles/responsibilities	Assignment of roles and responsibilities to specific activities of the workflow
IS	Support of activities through software systems

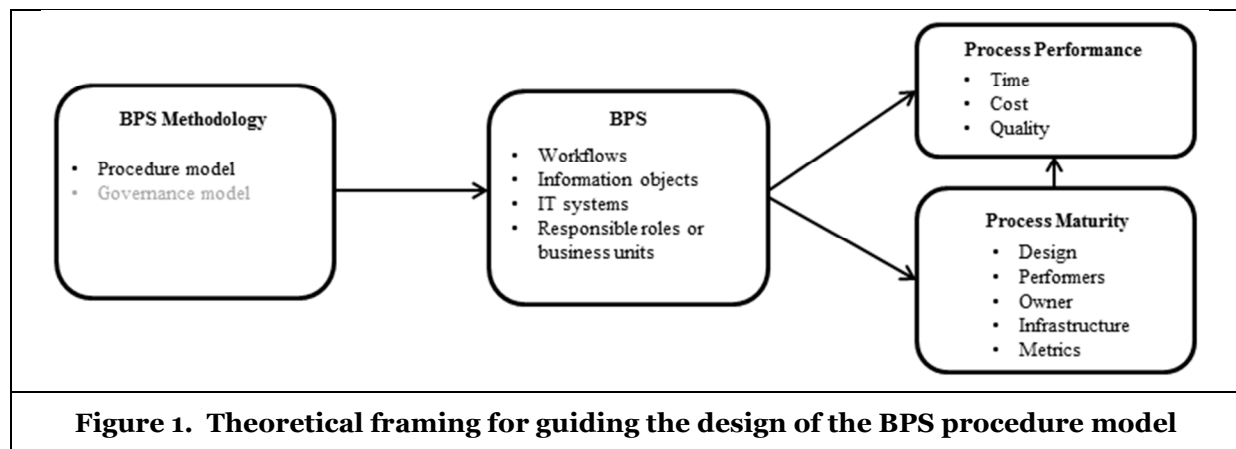
BPS Outcomes: Process Performance and Maturity

The overall objective of BPS is to increase operational performance, realize cost synergies, ensure quality, and better meet planned budgets (Manrodt and Vitasek 2004). Accordingly, several authors have empirically shown that BPS, or reduction of process variations, leads to higher process performance (Beimborn et al. 2009; Frei et al. 1999; Münstermann et al. 2010; Tsikriktsis and Heineke 2004). Some ways this higher performance is reached include decreasing process errors, facilitating communication and reporting, achieving economies of scale, and using expert knowledge (Wüllenweber et al. 2008).

Besides affecting process performance through higher economic efficiency, BPS also helps increase process maturity, which in turn ensures high process performance in a sustainable way. To conceptualize process maturity, we use the dimensions of the Process and Enterprise Maturity Model (PEMM) developed by Hammer (2007). BPS leads to greater cross-organizational transparency, better monitoring ability (Wüllenweber et al. 2008), and more effective coordination of organization-wide process changes. Therefore, BPS positively affects process maturity in terms of design, performers, owner, infrastructure, and metrics.

Business Process Standardization Methodology

In this paper, we draw on previous research on the determinants and consequences of BPS, which have their roots in organizational design and change as well as in standardization governance. These foundations inform a theoretical model that frames our work (Figure 1). In our design research project, we develop a holistic BPS methodology which consists of a procedure model and a governance model as tools for achieving BPS. While the procedure model guides the development and implementation of standardized processes, the governance model will be required to ensure that people adhere to the new standards and that changes to the process are made consistently (Münstermann and Eckhardt 2009). In this paper, we introduce the procedure model, which resembles the current progress of our design research project. The governance model will be added during the next iterations of the research cycle¹.



JoinIN! – A Procedure Model for Business Process Standardization

In the following, we introduce a procedure model for standardizing business processes across an organization, called JoinIN! (Figure 2). In developing this model, we drew on other standardization and Business Process Reengineering (BPR) methodologies (Davenport 1993; Davenport and Short 1990; Manrodt and Vitasek 2004; Münstermann and Eckhardt 2009; Münstermann and Weitzel 2008; Ungan 2006). The JoinIN! methodology defines three phases in which different process variants from various affiliated companies, locations, or business units are merged into a ‘*standard process*’ (Münstermann and Weitzel 2008). The procedure model is intended to be executed sequentially, but, if required, will also allow reiterations.

¹ A first conceptual idea of the governance model has already been presented at AMCIS 2013 (Kettenbohrer et al. 2013).

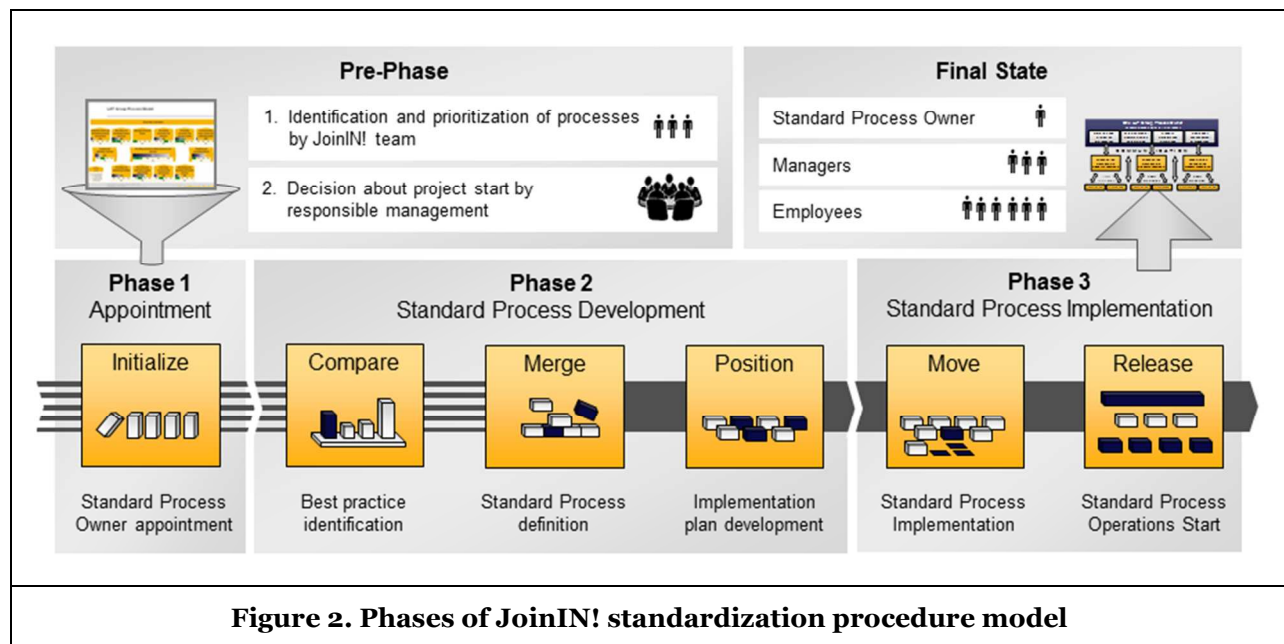


Figure 2. Phases of JoinIN! standardization procedure model

Pre-Phase: Identification and Prioritization

Before the actual standardization process can be conducted, potentially relevant processes have to be identified and selected taking a portfolio approach (Manrodt and Vitasek 2004; Schierholtz et al. 2007). The pre-phase is conducted by a central JoinIN! team with broad process management skills and sufficient insight into the firm's business processes (Ungan 2006; Davenport 1993). After selecting process candidates, this team can then also initiate the transformation and accompany the actual standardization activities, which are led and conducted primarily by separate teams.

Starting with a top-down procedure from the organization's top-level process map, the standardization potential of processes is evaluated jointly by the JoinIN! team, process owners, and process participants (Manrodt and Vitasek 2004; Ungan 2006), focusing on the general applicability of a process for standardization (structurability, homogeneity, integration etc.) and the expected benefits (cost, time, quality) (Münstermann and Weitzel 2008)². Finally, the executive board decides to launch or postpone a standardization project according to available JoinIN! team capacities and available project budget.

Phase 1: Appointment of the Standard Process Owner

Every standardization project starts with the appointment of the 'standard process owner' who is accountable for defining, improving and coordinating a process organization-wide (Manrodt and Vitasek 2004; Nesheim 2011). The JoinIN! team selects standard process owners from among process owners of existing process variants based on predefined criteria, such as Key Performance Indicators, experience, business volume, and then asks the executive board to confirm or revise their choices.

A similar process is followed to select the project team members for the actual process standardization procedure (phase 2). To ensure applicability and acceptance of the results of phase 2, all process owners of the current process are requested to participate in at least one of three ways: (1) be part of the on-site or on-line team, (2) comment on intermediate phase 2 results, or (3) integration within the standard process implementation only (phase 3). The goal of requesting active participation is to staff a team with highly motivated and involved project participants who represent all current process variants.

² Please note that this paper focuses on the actual standardization process and only touches on the selection of appropriate processes, resulting in a limited description of the pre-phase. Please refer to the Appendix (Table 4) for more information about the selection criteria.

Phase 2: Standard Process Development

Phase 2 is the core of the process standardization process and guides the actual compilation and development of the standard process. It consists of the following three steps:

#1 Compare: In the first step, the different process variants need to be compared to identify best practices (Münstermann and Weitzel 2008) already in place at any site (Münstermann and Weitzel 2008). In a first workshop led by a BPS expert from the JoinIN! team, the project team discusses the existing process variants based on process documentation and agrees on common criteria (e.g., cycle time, customer complaints, cost of material) to compare the process variants³. After the initial workshop, each process owner collects data about currently running process variants according to these selection criteria. Based on the results of the comparison, the project team identifies best practices at the different locations (Manrodt and Vitasek 2004) using a modified morphological box (Ritchey 2006; Zwicky 1969) in a second workshop.

#2 Merge: In a third workshop, the standard process is defined and modeled building on the best practices identified. Either a single best practice process is improved to generate a standard process or a new standard process is modeled using components of multiple best practices processes (Münstermann and Weitzel 2008).

#3 Position: The standard process is checked by the responsible managers of the different locations. They compare their current process variants with the standard process to identify potential barriers that restrain implementing and executing the standard process in that particular location, e.g., because of incompatibilities with other processes that interact with the process. Steps to remove these barriers are defined and resulting costs are estimated. Further, the previously collected process figures are used to evaluate expected benefits of applying the standard process. Benefits can appear at the local level (process performance in terms of cost, time, quality) and/or at the global level (controllability, single face to the customer). If the overall benefits exceed the expected overall cost, an implementation plan will be developed, describing the project proposal for the following phase 3. Implementation of the standard process will then be suggested at *all* subsidiaries even if some of them will need to invest more resources and effort than they will benefit at the local level. This so-called "standardization problem", where the locus of standardization effort and benefits might differ, needs to be addressed through certain governance and incentive mechanisms (Weitzel et al. 2006).

The result is then presented to the executive board, which decides whether or not to implement the standard process.

Phase 3: Standard Process Implementation

In phase 3, the different process variants are replaced by the new standard process (Münstermann and Weitzel 2008). This phase is only accomplished if phase 2 results in a positive business case, as confirmed by the executive board, or if the management decides to implement the process for strategic reasons.

Phase 3 takes place along two steps. In the first step ('Move'), the implementation plan is followed to coordinate the roll-out of the standard process. After removing the barriers, process participants have to be trained and obsolete processes phased out. The standard process is introduced gradually at more and more sites.

The second step is to release the standard process in a final workshop, to train the new standard process owner to manage the process from a centralized perspective, to organize process operations, and to ensure continuous improvement. It is designed to support sustainable implementation of the standard process.

Proof of Concept of the JoinIN! Procedure Model

A first pilot test of the developed standardization procedure has been executed for a process at LHT. Table 2 summarizes the procedure conducted, providing both an example and initial "proof by construction" (Nunamaker et al. 1991) for the JoinIN! procedure model.

³ An optional extension is to also look for best practices outside the firm, such as reference processes by industry associations. However, based on Münstermann et al.'s (2009) research indicating that external benchmarking delivers only minor additional benefits, it is advisable to rely primarily on internal best practices.

Table 2. Application of JoinIN! on a pilot process at LHT

Process	Assessing aircraft-related supplier's quality	<ul style="list-style-type: none"> - This process provides the quality assessment of suppliers of aircraft-related products for LHT - Process exists at all 32 LHT subsidiaries worldwide
Standardization potential	Applicability	<ul style="list-style-type: none"> - Process is very good to plan and to structure - One process for all inputs/outputs is possible - Many common legislative requirements have to be considered
	Benefits	<ul style="list-style-type: none"> - High potential for reduction of cycle time expected - Advancement of process is important
Phase 1	Standard process owner	- Process owner of former LHT Germany process appointed as standard process owner
Phase 2	Project team members	<ul style="list-style-type: none"> - Process experts of 9 European LHT subsidiaries - Position of project participants: quality manager or auditor
	Compare	- 12 common selection criteria defined, 5 discarded due to sparse data available → Data collected for 7 selection criteria (e.g., quality of supplier assessment, cycle time, completeness of supplier documentation)
	Merge	<ul style="list-style-type: none"> - Several best practices identified (e.g., 'minimum checklist' for audits, communication platform, online database for sharing of audit results) - Processes of 9 subsidiaries merged into one standard process
	Position	- New process communicated to subsidiaries: wide acceptance within first run, no real barriers identified, basic training necessary
Phase 3	Implementation	<ul style="list-style-type: none"> - Process implementation within 3 months at 9 LHT subsidiaries - Facilitated procedures and increased compliance by best practices - Increased knowledge exchange across subsidiaries (e.g., common record retention periods and audit intervals), more optimization opportunities, and shared information (e.g., joint communication platform)

Validation of the Procedure Model and Next Steps

In this ongoing research project, we have developed and experimentally implemented a new process standardization methodology in an existing organization⁴. Therefore, our research can be categorized both as design science⁵ (DS) and action research⁶ (AR). Recently, there has been some debate on whether these two interventionist approaches are similar, complements, or alternatives (Baskerville 2008; Järvinen 2007; Papas et al. 2012). According to the set of questions in (Papas et al. 2012), which support a differentiation between both methodologies, our research approach can be categorized rather as design science because developing the artifact (JoinIN!) and evaluating its effectiveness are central to our work. We therefore do mainly apply DS guidelines. However, we also follow the aim of AR to produce collaborative learning effects within the organization from applying the developed artifact and will complementarily use AR guidelines in later steps in order to generate new knowledge. In this context, Sein et al. (2011) have proposed an "Action Design Research" approach which aims at better integrating DS views on construction with the AR perspective on evaluating and enriching pure design science in a real-world context, which otherwise would fail "to capture organizational aspects of the intervention". As consequence, we align our research primarily with Hevner et al.'s seven DS guidelines (referred to as 'HMPR' in the following) but do also consider the specifications from (Sein et al. 2011).

So far, the paper should have clarified that we develop an artifact (JoinIN!, a process standardization methodology) (HMPR #1) that solves a substantial business problem (i.e., process variance causing substantial inefficiencies) (HMPR #2). Further, sound DS research should follow a search process, or a "generate/test cycle" (Simon 1996) (HMPR #6). Since it is often not possible to expand a complete solution

⁴ Up to now, the following persons have been involved in the project: 2 university professors, 2 PhD students (same university) working actively during half of their time at LHT, project lead and several BPM managers from LHT.

⁵ Design science: "understanding of a problem and its solution are achieved in the building and application of and designed artifact" (Hevner et al. 2004)

⁶ Action research: "researchers interact with practitioners" (Papas et al. 2012, p. 147) in order to "solve current practical problems with expanding scientific knowledge" (Baskerville and Myers 2004)

space for a given problem to determine the optimal solution, heuristic search strategies are commonly accepted as producing good and feasible designs, too (Hevner et al. 2004). For JoinIN!, we have, up to now, adopted the following search process, which also acknowledges the guidelines from Sein et al. (2011):

- In project phase A ('develop'), the general procedure model for BPS was developed. We started by deriving the target of the methodology from the target of the project. This defined the gap to be closed: from variety of today's processes to a single best-practice process performed by all subsidiaries. The details of the procedure were developed during several workshops. Within these workshops, we defined the steps of the JoinIN! phases in a top-down approach based on the above referenced literature (e.g. Davenport 1993; Davenport and Short 1990; Manrodt and Vitasek 2004; Münstermann and Eckhardt 2009; Münstermann and Weitzel 2008; Ungan 2006) and discussed the interaction of the steps within the project team until we were able to prepare all necessary tools, templates, and presentations to perform the phases. Whenever possible, we tested the steps with a virtual process in the project team and thus revised the methodology in several cycles.
- In project phase B ('validate'), we applied JoinIN! in the context of a pilot project (cf. Table 2) to validate the result of phase 1. Therefore, we performed all steps as defined, while a colleague who did not actively participate recorded feedback by the participants and his own observations. After every single step (e.g., the workshop to identify best practices), we discussed the minutes within the project team and identified ideas to improve the methodology for performed as well as for next steps. The validation phase was completed by a final review of all findings and an update of tools, templates, and presentations defined by the project.

According to HMPR #5, the research process has to apply rigorous methods during both the construction and evaluation of the design artifact. More precisely, we can differ between rigor of the theoretical foundations that underlie the construction and rigor of the evaluation approach (Arnott and Pervan 2012).

As theoretical foundations for developing the methodology, we drew on previous research on the determinants and consequences of process standardization (for references see section on theoretical framing above), which are grounded in the rich strands of organizational change and agency problems (e.g., Volkoff et al. 2007), and standardization governance (e.g., (Weitzel et al. 2006)). For example, the BPS methodology needs to take into account the potentially differing locus of effort vs. utility. While the standardization effort appears in the subsidiary, the main benefit from BPS might appear on the overall organization level (e.g. compliance, economies of scale) (Weitzel et al. 2003). Hence, the methodology has to consider potential agency problems in truthful reporting, leading to certain incentives and project membership selection mechanisms. The theoretical foundations were used to develop a theoretical model that frames our work and allows for proper evaluation.

During the next construction phase of the development cycle, we will extend the theoretical foundations to organizational governance and organizational control (Kirsch 1997), which will inform the development of a BPS *governance* model that is required for *sustainable* standardization: semi-autonomous behavior of subsidiaries in decentralized organizations is not always efficient from a centralized perspective; the gap between the local and global optimum can be a severe inhibitor for consistent BPS (Tregear 2010), which needs to be overcome by appropriate governance strategies, involving formal control and responsibilities, communication, and even incentives, to make sure that the subsidiaries adhere to the defined standards.

Evaluation of the developed artifact and rigor in evaluation are another crucial DS requirement (HMPR #3 combined with #5). Developing an artifact that has not proven to solve a problem or to substantially improve a situation is not design *science*. While we conducted evaluation-steps during the search process, as outlined above, an evaluation of the created artifact is still to be done⁷. According to Figure 1, a rigorous evaluation of JoinIN! has to be conducted along three stages:

⁷ Papas et al. (2012) draw on (Gray 2009) to differentiate between "evaluation-steps", referring to the in-cycle evaluation, and "evaluation" referring to the effectiveness of the created artifact. DS emphasizes the latter, asking for a rigorous formal evaluation (Peppers et al. 2007), while "evaluation-steps" stem from AR and can rather be understood as part of the construction phase in DS (Papas et al. 2012).

1. Evaluation of the methodology itself: The BPS methodology needs to be evaluated regarding its applicability which must not be confused with evaluating a certain BP regarding its applicability to BPS in the pre-phase of JoinIN!. Typical aspects are feasibility and acceptance of the approach (Peffers et al. 2007), context dependency (or, reversely, the question whether the artifact can be applied in other contexts) (Hevner et al. 2004), and effectiveness (manifested by the following stages #2 and #3)
2. Evaluation of the methodology's impact on BPS: The methodology needs to be evaluated regarding its impact on BPS. Does the procedure model actually lead to sufficient organization-wide standardization of processes? This will be formally measured by using similarity measures that compare the standard process with the process as actually running in a certain subsidiary (along the different dimensions of workflow, roles/responsibilities, information objects, and IT (cf. above) (Dijkman et al. 2011; Li et al. 2008; Sekatzek and Krcmar 2009)).
3. Evaluation of the methodology's impact on BPS effectiveness: Finally, we will evaluate whether the process methodology has led to *effective* BPS. The theoretical model (Figure 1) covers several dimensions for both process maturity and performance which need to be measured in the different subsidiaries. Measures for evaluation are given by Table 3.

Table 3. Evaluation measures for process performance and process maturity (adapted to LHT context and pilot process)		
Dimension		Indicators
Process Performance	Time	- Cycle time from process start to end of process - Lead time of process without idle time
	Cost	- Cost of material used in the process - Cost of outsourced process steps
	Quality	- Number of complaints by customers of the process - Number of audit findings
Maturity	Design	- Degree of completeness of process documentation
	Performers	- Quota of completed process trainings - Number of improvement ideas by process participants
	Owner	- Degree of process owner integration into target agreements of employees - Accuracy of rolling strategic plan for improvement of process
	Infrastruc- ture	- Degree of IT system integration to support process execution - Degree of integration of role definitions into job descriptions of employees
	Metrics	- Evaluation of metric application to operate and control process

Finally, if the new procedure model proves to be applicable and effective, it allows for solving a substantial and complex problem in the BPM context and thus represents a clear contribution (HMPR #4), which can then be disseminated to other organizations and contexts (HMPR #7 “communication of research”).

Conclusion

Motivated by the need for formal and consistent methodologies for conducting successful BPS projects, we developed a process standardization methodology named JoinIN! that supports organizations in conducting effective BPS. Thus, JoinIN! combines and enhances previous models (e.g. Davenport 1993; Davenport and Short 1990; Manrodt and Vitasek 2004; Münstermann and Eckhardt 2009; Münstermann and Weitzel 2008; Ugan 2006) and constitutes a realizable and holistic procedure model. This methodology can help practitioners to start a company-wide standardization project because, in contrast to other methodologies, it provides a detailed approach description that can be validated regarding suitability, effectiveness, and generalizability. In its current state, the methodology JoinIN! has been completely developed and has been applied to a first pilot process and five additional ongoing projects. The ongoing research cycle of evaluation and further construction will improve the current methodology and also broaden it by integrating governance mechanisms. Overall, we expect these BPS methodologies to reap substantial process efficiency gains in large and decentralized firms such as LHT.

Appendix

Table 4. Dimensions of prioritization methodology		
Dimension	Sub-Dimension	Explanation
Applicability	Programmability and structurability	Evaluation of how detailed the process can be described in advance and of the possibility to break down the overall process into parts
	Homogeneity	Evaluation to which extent inputs and outputs are equal between process-executions
	Frequency	Evaluation of frequency of process executions within a given period
	Integration	Evaluation of impact on higher, subordinate, or adjacent processes
	Regulations	Evaluation of internal/external organizational requirements (e.g., legal basic conditions, public authority regulations, international standards)
Benefits	Cost	Evaluation of expected cost savings resulting from standardization (e.g., through efficient use of resources, synergies, documentation)
	Time	Evaluation of expected cycle or lead time reduction
	Quality	Evaluation of the reduction of non-conformity, error frequency (e.g., first pass yield), or customer satisfaction
	Process advancements	Evaluation of the importance of continuous improvement

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